The opinion in support of the decision being entered today is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TODD D. CREGER, JAVAD HOSSEINI,
and JAGANATHAN SARANGAPANI

Appeal 2007-1088
Application 10/006,959
Technology Center 2100

Decided: July 31, 2007

Before JAMES D. THOMAS, JOHN C. MARTIN,
and JEAN R. HOMERE, *Administrative Patent Judges*.

THOMAS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal involves claims 1 through 12, constituting all claims pending in the application. We have jurisdiction under 35 U.S.C. §§ 6(b) and 134(a).

As best representative of the disclosed and claimed invention, independent claim 7 is reproduced below:

7. A method for compensating for variations in modeled parameters of a test machine compared to a model development machine, including the steps of:

delivering a neural network model from the model development machine to the test machine;

determining a computed parameter on the test machine;

estimating the parameter on the test machine with the delivered neural network;

comparing the computed parameter with the estimated parameter; and

updating at least one of an estimator and the neural network model on the test machine in response to variations in the computed parameter and the estimated parameter.

The following references are relied on by the Examiner:

Talbott	US 6,411,908 B1	Jun. 25, 2002 (Filed August 2, 2000)
Jelley	US 2002/0138240 A1	Sep. 26, 2002 (Effective Filing Date August 9, 2000)

Claims 1 through 5, 7, and 8 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Jelley. Claims 6 and 10 through 12 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the Examiner relies upon Jelley in view of Talbott. The Examiner has also set forth a separate rejection of dependent claim 9 under 35 U.S.C. § 103, by relying upon Jelley in view of Appellants' assertions. These appear to be based upon the statements at Specification page 7, paragraph [35] where it is stated that

"[n]eural network weights are well known in neural network theory and applications, and will not be described further."

Rather repeat the positions of the Appellants and the Examiner, reference is made to the Brief and Reply Brief for Appellants' positions, and to the Answer for the Examiner's positions.

OPINION

For the reasons set forth by the Examiner in the Answer, as expanded upon here, we sustain the respective rejections of all claims on appeal.

As reflected beginning at page 13 of the principal Brief on appeal, Appellants' principal argument for all the rejections of the claims on appeal is that Jelley uses only a single model to predict a machine parameter. The subject matter of independent claims 1 and 7 on appeal is said to require two machines and two models that predict machine parameters. In response, the Examiner correctly held in the paragraph bridging pages 9 and 10 of the Answer that the neural network model of the claimed model development machine is broad enough to read on providing a trained baseline neural network as taught in Jelley.

Of major significance in this appeal are the following remarks by the Examiner at page 10 of the Answer:

> Second, as described at page 6, paragraph [29], "In some circumstances, the model development machine 104 may function as a test machine 606" and at page 7, paragraph [32], "In a first control block 402, a neural network model 802 is delivered from the model development machine 104 to each test machine 106." In view of the specification, the neural network model of the test machine is delivered from the model development machine. Therefore, these two models (i.e., the neural network model on the model development

> machine and the delivered neural network model on the test machine) are the same before further updating the delivered neural network model on the test machine. Furthermore, "the model development machine 104 may function as a test machine 606" implies that they may be the same machine. In other words, during the baseline training stage, a machine having a trained baseline neural network would be a mode development machine. Later on, when the same machine having the same trained baseline neural network is ready to have a fine-tuning at the specific work site it functions as a test machine. Accordingly, in view of the specification, Jelley's steps for training a neural network anticipate the argued limitation.

We are not persuaded by Appellants' remarks beginning at page 2 of the Reply Brief that the Examiner has mischaracterized Appellants' claimed invention. Appellants argue Appellants' disclosure rather than the claimed invention when they characterize claims 1 and 7 as requiring *separate* machines and *separate* models. The claim language does not preclude the Examiner's view that the same machine and model can function at different times as the claimed "model development machine having a first at least one model" and as the claimed "at least one test machine having a second at least one model." Appellants (Reply Br. 3) take issue with the Examiner's above-quoted interpretation of "[i]n some circumstances, the model development machine 104 may function as a test machine 606" (Specification para. 29) to mean "these two models (i.e., the neural network model on the model development machine and the delivered neural network model on the test machine) are the same" (Answer 10). However, Appellants have not provided an alternative explanation of the meaning of that statement in the Specification. We also agree with the Examiner's above-noted conclusion that the language "delivering a neural network model from the model

development machine to the test machine" in claim 7 is broad enough to read on the same machine and model at different times.

We turn now to the Appellants' argument that the claimed comparing and updating features of the claims on appeal are not taught in Jelley. Appellants do not deny that Jelley discloses comparing data and using the results of the comparison to update the neural network. Instead, they deny that Jelly compares "data" from a test machine with "corresponding data" from the model development machine (claim 1) (Br. 14) or that he compares a "computed parameter" from a test machine to an "estimated parameter" from the test machine (claim 7) (Br. 16). These claim limitations also read on Jelley when the claimed machines and models are read on Jelley's single machine and neural network at different times. Jelley compares a measured (i.e., actual) value of an operating parameter (e.g., lateral acceleration) to the value predicted for that operating parameter by the neural network (Jelley para. 61). Using the terms of claim 1, the predicted value corresponds to the recited "corresponding data of the model development machine" and the measured value corresponds to the recited "data from the at least one test machine." In claim 7, on the other hand, both of the compared values are from the test machine and consist of (1) a "computed parameter" determined on the test machine and (2) an "estimated parameter" provided by the neural network on the test machine. The "computed parameter" corresponds to Jelly's measured parameter value and the "estimated parameter" reads on Jelley's predicted parameter value.

Figure 11 of Jelley would clearly convey impliedly to an artisan a comparative functionality between a measurement obtained from a test

machine and that which has been predicted by a model-based machine. Actual measurements or tests are discussed in paragraph 60 at page 4 of Jelley. Moreover, the discussion from paragraph 61 to the discussion of figure 11 at pages 4 and 5 of Jelley can clearly convey to the artisan the comparative nature of neural network machines in a learning environment. In making reference to figure 11 in paragraph 63, it is noted that substantial agreement is shown between the actual measurements in a test environment with those in a modelled environment. To the extent neural networks inherently are learning devices, the implied need to be updated, if there were not substantial agreement, is clearly conveyed to the artisan here. The refinement necessary in the neural network environment of paragraph 18 in the Summary of the Invention is conveyed as an updating-type function.

As noted by the Examiner at the bottom of page 13 of the Answer, Appellants rely for the patentability of dependent claims 2 through 5, 8 and 9 upon the arguments presented with respect to independent claims 1 and 7 on appeal which we have found unpersuasive.

Turning to the rejection of independent claim 10 under § 103 relying upon Jelley in view Talbott, we note the Examiner's position reflects the view that Jelley does not expressly disclose the feature of determining an aging factor. This claimed feature is based on paragraph 40 of the Specification at page 8, which explains that the number of hours of operation of each machine may be logged and converted into an aging factor to account for normal wear and tear of the machine. Jelley's page 1, paragraph 15, relied upon by the Examiner, acknowledges this aging problem: "The existing [design] methods . . . generally assume that the wear

rate of the cutting structures is substantially constant over the life of the drill bit, which may not be the case."

Appellants' remarks in the principal Brief and the Reply Brief do not contest the Examiner's additional reliance upon Talbott for the same teaching regarding the effect of aging. Page 18 of the principal Brief, which discusses Talbott, does not deny that it teaches what the Examiner asserts it teaches.

Appellants' assertion that Talbott does not disclose or otherwise remedy the deficiencies of Jelley relating to updating (page 18 of the principal Brief; page 5 of the Reply Brief) is misplaced since the Examiner has not relied upon Talbott for this teaching.

As noted at page 15 of the Answer, Appellants do not assert patentability of dependent claims 11 and 12 and dependent claim 6 in this rejection on their own merits, but merely respectively rely upon the features argued with respect to independent claims 1 and 10 which we have found unpersuasive of patentability.

Lastly, we turn to the separate rejection of claim 9, as to which the Examiner relies upon Appellants' assertions in addition to the teachings in Jelly. These assertions are mentioned at page 16 of the Answer as being reflective of the actual admissions of Appellants at paragraph 35 of the Specification page 7. The essence of the principle relied upon by the Examiner is that neural network weights are well-known in neural network theory and application. Appellants' remarks regarding claim at page 19 of the principal Brief (no remarks as to this claim are presented in the Reply Brief) do not argue against the Examiner's reliance upon these admissions or

their combinability with the neural networks of Jelley. Instead, Appellants rely for patentability on the arguments previously presented with respect to independent claim 7, which we have found unpersuasive.

In view of the foregoing, the decision of the Examiner rejecting claims 1-12 under 35 U.S.C. §§ 102 and 103 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. §1.136(a). See 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

pgc

Caterpillar Inc.
Intellectual Property Dept.
AB 6490
100 N.E. Adams Street
PEORIA IL 61629-6490